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PILOT'S HANDBOOK

1994 EDITION

Alberta
ENVIRONMENTAL PROTECTION
Land and Forest Services

THE ALBERTA LAND AND FOREST SERVICES

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ENVIRONMENTAL PROTECTION
Land and Forest Services

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1. Introduction

This handbook is intended for all pilots working on fire management programs. It will give them an insight into the fire organization and basic information on policies and procedures of Alberta Land and Forest Services.

Alberta Land and Forest Services (LFS) is within the Department of Environmental Protection. Its responsibilities in the area of land management include fire control, timber, watershed, grazing and recreation for approximately 52.9% of the province, or 349,726 square kilometres.

In order to make the job of safeguarding the forests more manageable, Alberta's Green Area has been divided into 10 regional zones referred to as "Forests". These range in size from the small but heavily populated Bow/Crow Forest in the southwest corner of the Province to the vast but sparsely populated Footner Lake Forest in the northwest. Each forest has a headquarters, typically located in a major town or city within its boundaries. It is there that the various protection activities — fire prevention, detection, presuppression, insect and disease control — are coordinated and monitored by a forest protection officer and technical specialists working under the direction of a forest superintendent. Each of the 10 forests are further subdivided into three or more ranger districts. The field officer in charge of a district is a chief ranger.

The objective of the Forest Protection Division is to restrict the area burned to less than one tenth of one percent of the area under protection. To achieve this objective, rapid initial attack and suppression support are required. The rotary-wing aircraft pilot must be well trained and competent. Aircraft must be in good condition, well maintained and available at daily standby.

In addition to forest fire protection, aircraft are also used in other forest management projects.

The primary decision making centre for Alberta's overall forest protection effort is the Provincial Forest Fire Centre (PFFC) in Edmonton. It is out of this facility that province-wide policies and programs are initiated.

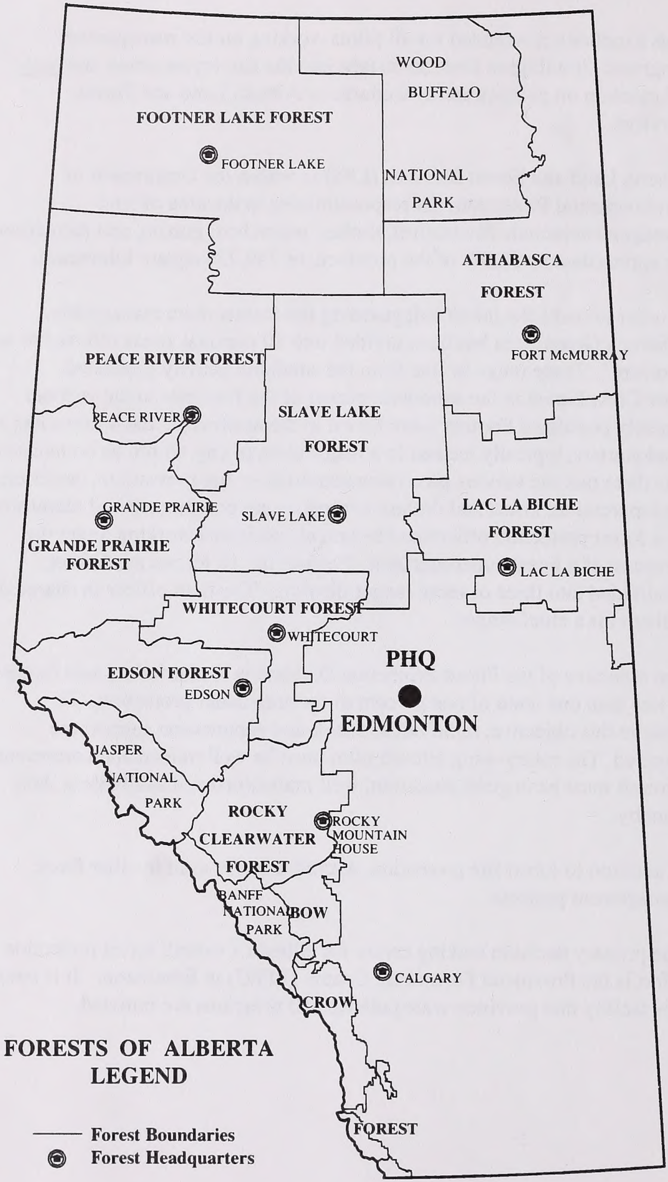

WOOD
BUFFALO
NATIONAL
PARK
FOOTNER LAKE FOREST
FOOTNER LAKE
ATHABASCA
FOREST
FORT McMURRAY
PEACE RIVER FOREST
PEACE RIVER
SLAVE LAKE
FOREST
GRANDE PRAIRIE
SLAVE LAKE
LAC LA BICHE
FOREST
GRANDE PRAIRIE
FOREST
LAC LA BICHE
WHITECOURT FOREST
WHITECOURT
PHQ
EDSON FOREST
EDSON
EDMONTON
JASPER
NATIONAL
PARK
ROCKY
CLEARWATER
FOREST
ROCKY
MOUNTAIN
HOUSE
BANFF
NATIONAL
PARK
BOW
CALGARY
CROW
FOREST
FORESTS OF ALBERTA
LEGEND
Forest Boundaries
Forest Headquarters

CHART 1

EXECUTIVE MANAGEMENT (LFS)

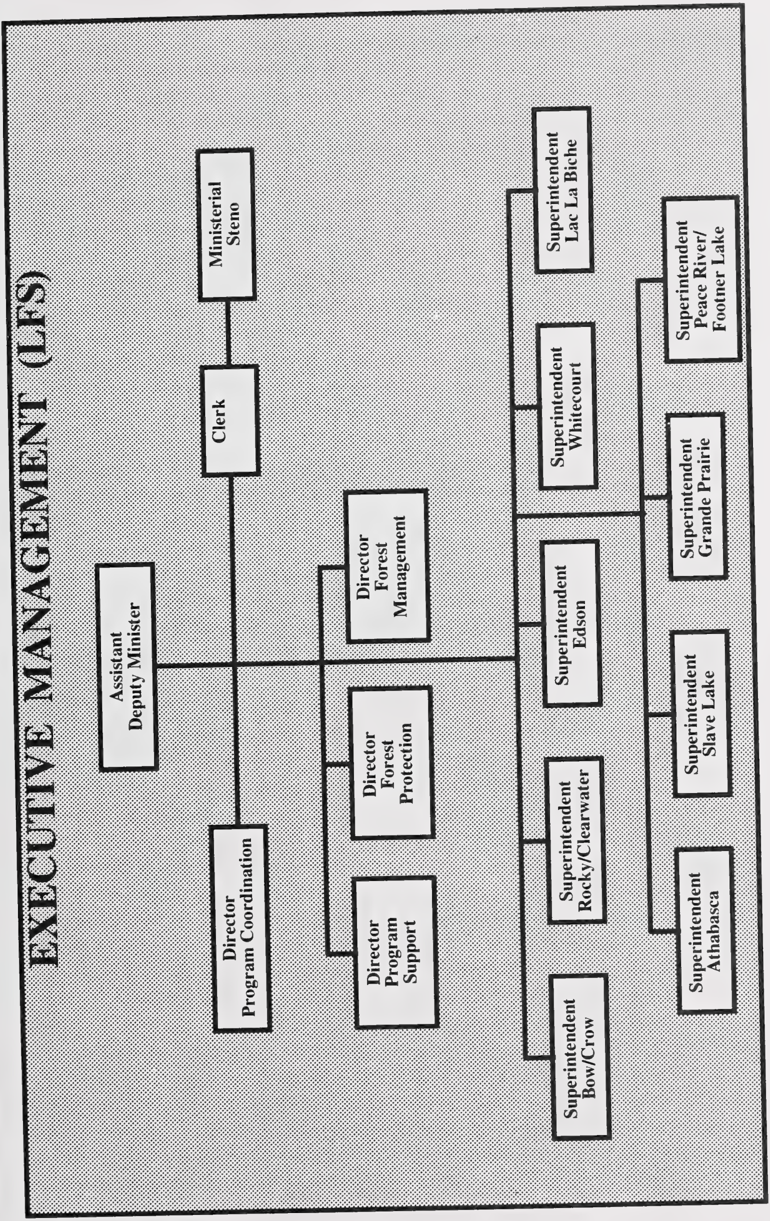

Assistant Deputy Minister
Clerk
Ministerial Steno
Director Program Coordination
Director Program Support
Director Forest Protection
Director Forest Management
Superintendent Bow/Crow
Superintendent Rocky/Clearwater
Superintendent Edson
Superintendent Whitecourt
Superintendent Lac La Biche
Superintendent Athabasca
Superintendent Slave Lake
Superintendent Grande Prairie
Superintendent Peace River/Footner Lake

CHART 2

FOREST PROTECTION BRANCH

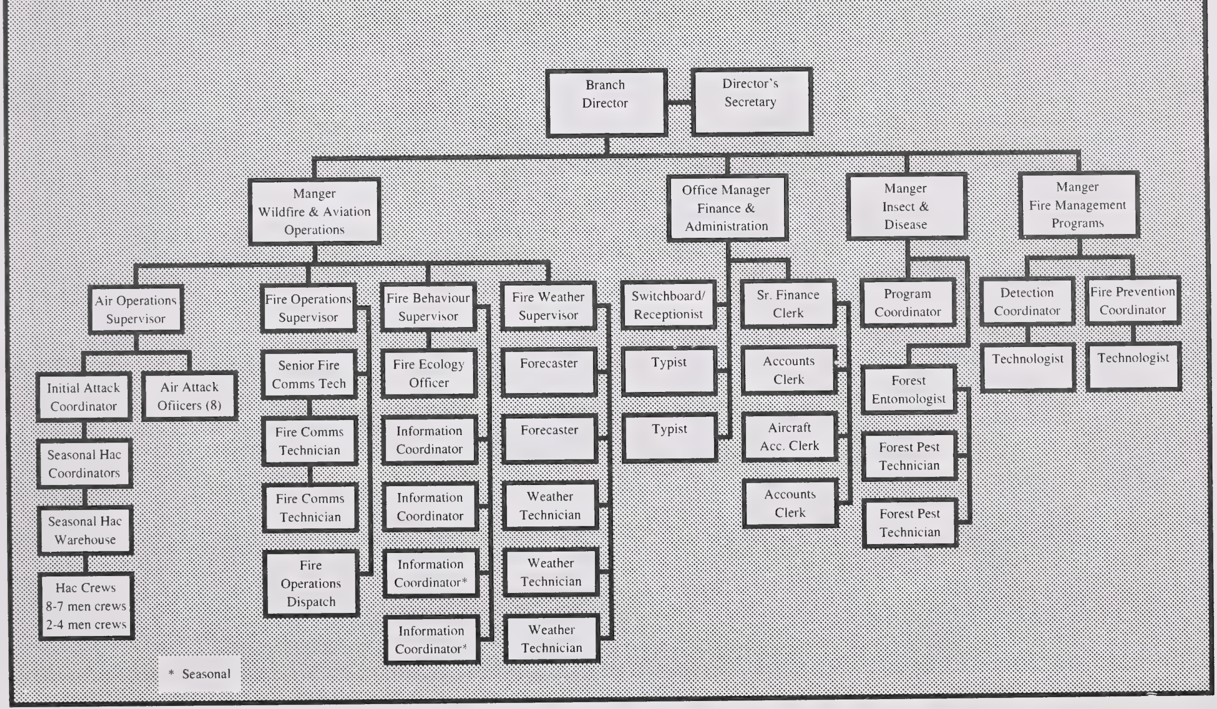
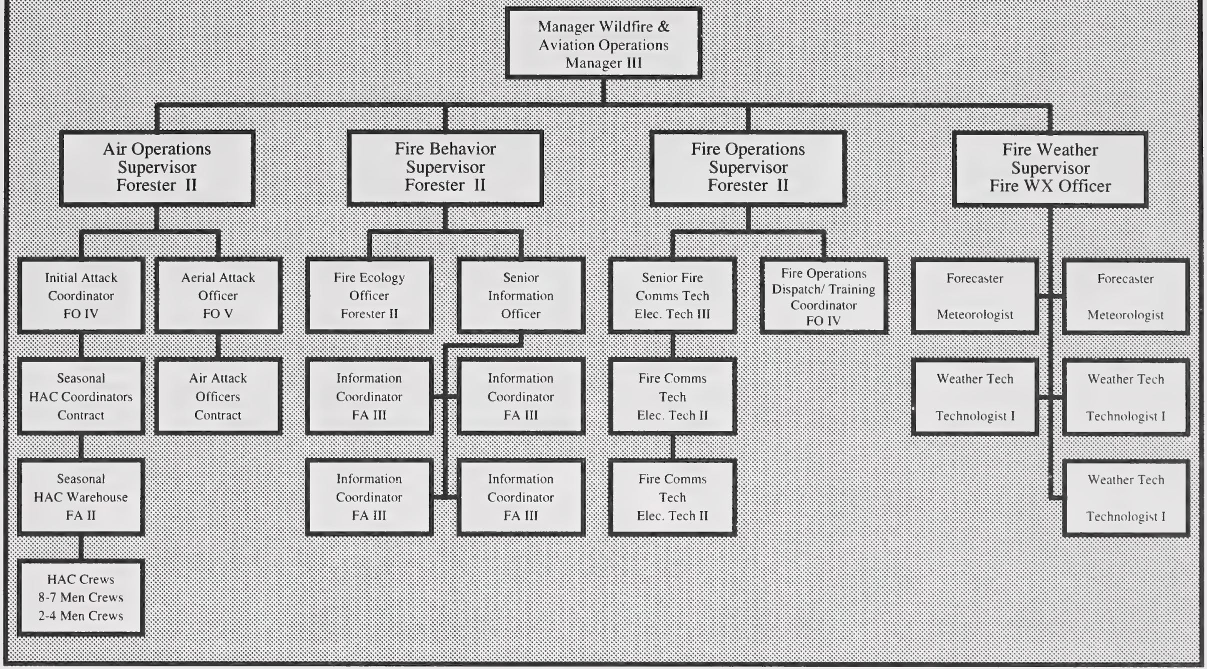


CHART 3

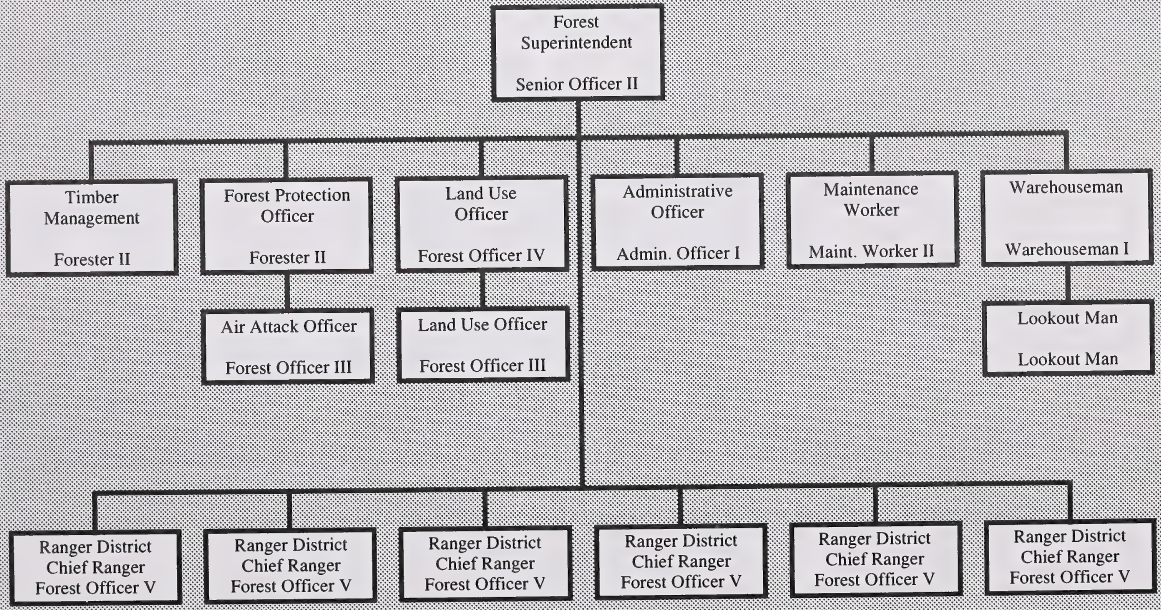
WILDFIRE & AVIATION OPERATIONS



Manager Wildfire & Aviation Operations Manager III
Air Operations Supervisor Forester II
Fire Behavior Supervisor Forester II
Fire Operations Supervisor Forester II
Fire Weather Supervisor Fire WX Officer
Initial Attack Coordinator FO IV
Aerial Attack Officer FO V
Seasonal HAC Coordinators Contract
Air Attack Officers Contract
Seasonal HAC Warehouse FA II
HAC Crews 8-7 Men Crews 2-4 Men Crews
Fire Ecology Officer Forester II
Senior Information Officer
Information Coordinator FA III
Information Coordinator FA III
Information Coordinator FA III
Information Coordinator FA III
Senior Fire Comms Tech Elec. Tech III
Fire Operations Dispatch/ Training Coordinator FO IV
Fire Comms Tech Elec. Tech II
Fire Comms Tech Elec. Tech II
Forecaster Meteorologist
Forecaster Meteorologist
Weather Tech Technologist I
Weather Tech Technologist I
Weather Tech Technologist I

CHART 4

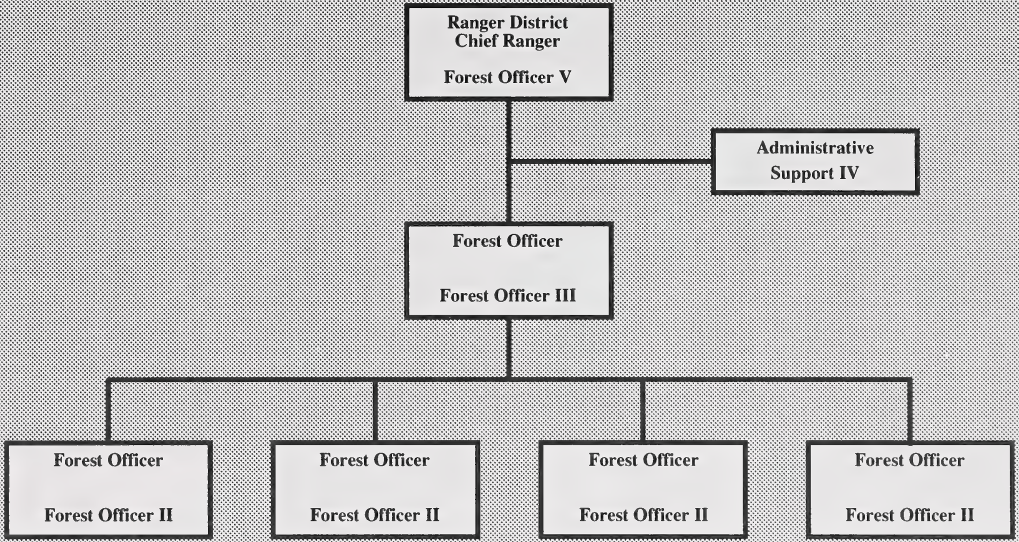
FOREST ORGANIZATION CHART



NOTE: Positions vary among forests

CHART 5

DISTRICT ORGANIZATION CHART



Operations Section at PFFC

1. Daily provincial presuppression preparedness requirements.
2. Provision of adequate, safe, cost effective, coordinated aircraft services to the branches within the department.
3. Provision and allocation of resources to support field operations.
4. Maintenance of an efficient provincial dispatch centre.
5. Liaison with Transport Canada on regulatory matters.

1.2 Key Responsibilities of Finance and Administrative Service Section at PFFC

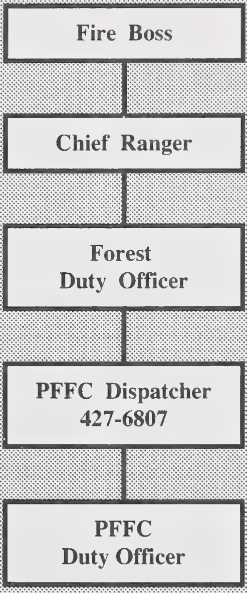
1. Drafting and interpretation of contracts.
2. Verifying, processing and coding accounts pertaining to aircraft operations, including expense accounts and landing fees.

1.3 Duty Officer Duties

1. Responsible for monitoring of presuppression resources and allocation of provincial resources to meet immediate needs.
2. Responsible for daily presuppression resources review and negotiating man-up requirements for the following day with each forest region.
3. Responsible for aircraft dispatch and coordination for the Department and ensure all departmental policies and procedures are adhered to.
4. Initiates search and rescue for downed and missing aircraft working for the Department.
5. Ensures LFS/ATS contract safety officer inspects all aircraft and checks pilot experience prior to commencement of seasonal contracts. Ensures follow up to all aviation incidents and occurrences.

CHART 6

Line of Authority for Aircraft Utilization on Fires



For all field activity, the forest protection officer has full and final authority for aircraft utilization or problems in his jurisdiction. The Manager, Wildfire and Aviation Operations or Director of Forest Protection has final operational authority and should be consulted for concerns that are not resolvable at the regional level.

2. The Alberta Land and Forest Services Fireline Organization

2.1 General History

Forest protection in Alberta began officially in 1883, when a forest ranger was appointed each in Calgary and Edmonton to work under the Crown timber agent, who was located in Winnipeg. These two men were responsible for the northern and southern half of the province respectively.

In 1905, The Alberta Act was passed to establish the Province of Alberta, but ownership of natural resources was not transferred to the provincial government until 1930. On October 1, 1930, the Forest Service of the Department of Lands and Mines became responsible for the major forestry activities in Alberta.

The development of the fireline organization in Land and Forest Services (formerly called the Alberta Forest Service) began with the establishment of a certification program for firefighters in 1963. Further major development occurred on April 29, 1968, when a firefighting policy statement was issued, defining a forest protection area and the principles of proper fire control. This was also a disastrous fire year, in which almost 1 million acres of forest land burned. It gave impetus to implementing the inter-forest dispatch of fire crews and importing the required supervisory personnel from outside forests. The existing Fireline Organization was researched and developed during the fall and winter of 1968/69. Several revisions were made as operating experience was gained.

Widespread government reorganization in 1993 resulted in further changes to the Alberta Forest Service, which included changing the name of the organization to Land and Forest Services (LFS). In addition to the full-time staff, numerous highly trained seasonal firefighters and field support workers are employed. Backed by airtankers, helicopters, chemical fire retardants, lightning location systems, infrared scanners, computer graphics and a fireline communications system, LFS is better equipped than ever to handle the challenge of tomorrow.

2.2 Basics of the Fireline Organization

The Fireline Organization of LFS is based on the following organizational premises.

1. A basic squad consists of 7 firefighters and 1 squad boss while a basic crew shall be composed of 21 firefighters, 3 squad bosses and 1 crew boss.

2. No squad boss should supervise more than seven firefighters.

3. No crew boss should supervise more than three squads.

4. No sector boss should supervise more than three crews.

5. No division boss should supervise more than three sectors.

2.3 Organizational Build-up

The build-up of the fireline organization consists of four separate stages according to the number of personnel:

1. Crew fire - 1 to 25 basic personnel.

2. Sector fire - 26 to 75 basic personnel.

3. Division fire - 76 to 225 basic personnel.

4. Zone fire - 226 to 675 basic personnel.

2.3.1 Buildup Procedures

While the entire Fireline Organization is designed to give maximum flexibility so as to meet all eventualities, there are buildup procedures that should be adhered to.

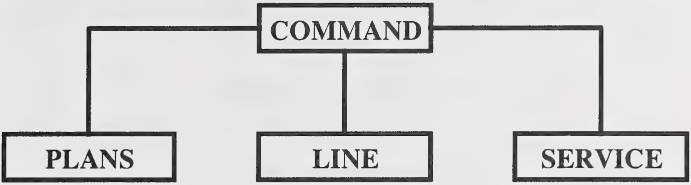
1. If the number of basic personnel on a fire exceeds the maximum at any stage, then the next higher stage must be considered to meet fire requirements.

2. When deployment occurs at any stage of build-up, and it becomes necessary to deploy the manpower in that stage in smaller separate units, then the appropriate supervisory overhead should accompany each smaller, separate unit.

3. If a double shift on a particular fire is necessary, the requirement stated in #1 above applies. In other words, the number of basic personnel employed on a fire, regardless of whether it is single-shift or double-shift, dictates the stage of manpower that should be deployed.

2.4 Fireline Organization Management Functions

In the formation of the LFS Fireline Organization four basic functions have been employed, that is: Command, Line, Plans and Service.



- The Command Function is responsible for evaluating the known circumstances, anticipating future developments and then developing a fire strategy and putting into effect in the most satisfactory and effective manner possible. On every fire, one (and only one) individual is recognized as the fire boss at all times. This individual may be replaced after a period of time. In a well-manned organization, it is reasonable to presume that the person who started as a fire boss on a small fire may be replaced by a certified individual if the fire increases in size and complexity. This is not a reflection of the person's ability, but recognizes the organization's responsibility to assign a new fire boss with proven administrative experience and knowledge. When required, the command function coordinates and directs the following three functions to ensure the most efficient use of personnel and equipment to suppress the fire, acting within the strategic constraints established by the department.

- The Line Function encompasses all direct firefighting operations including fireline construction, backfiring, burning out, detection and control of spot fires, application of water and/or retardants from the ground or air, managing all suppression equipment, supervision of all suppression personnel, mop-up, patrol and final fireline inspection. In short, this function has the responsibility for ensuring the fire is put out and stays out.

- The Plans Function is responsible for collecting and analyzing information pertinent to the fire, developing this information into detailed suppression plan for final approval by the fire boss, and documenting the suppression effort. Good communications and accurate information are vital to proper planning.

- The Service Function obtains personnel and equipment, provides for maintenance (food, lodging, refurbishing, replacement), and ensures these resources are distributed to the locations called for in the suppression and/or demobilization plan. This function is also responsible for maintaining accurate and complete records of all fiscal expenditures accrued for the fire.

2.4.1 Function Delineation

1. To avoid duplication and overlapping of effort, it is necessary to separate tasks within the framework of each function.

2. The Command Function does not require delineation of tasks because on every fire, one and only one individual is recognized as being the fire boss.

3. The Line Function is not divided into sections, because the entire function is engaged in the single task of actually suppressing the fire; therefore, all Line Personnel operate as a single entity. The special units, i.e., dozer units or fire bombing units, when employed, are to be considered an integral part of the Line Function entity.

4. The Plans Function is divided into three sections: Communications, Fire Behaviour and Intelligence.

    a. The Communications Section is responsible for the establishment, implementation, deployment and operation of suitable communications.

    b. The Fire Behaviour Section is responsible for identifying unusual fire hazards or risks that may exist because of fuel, topography, weather or a combination of these. The section issues fire behaviour forecasts, collects on-site weather data, transmits this data to weather forecasting facilities, coordinates the receipt of weather forecasts and provides on-site weather forecast interpretation.

    c. The Intelligence Section is responsible for gathering and compiling all the information necessary to draft a plan to control the fire, and for maintaining a complete record of all actual fire activities.

5. The Service Function is divided into four sections: Supply, Food and Lodging, Accounts and Heavy Equipment.

    a. The Supply Section is responsible for obtaining, dispatching and recovering all supplies and equipment, and facilitating delivery of same. In addition, this section is responsible for maintaining supply records, monitoring supply levels and conducting field maintenance of tools and equipment.

b. The Food and Lodging Section is responsible for providing food and lodging for all fireline personnel.

c. The Accounts Section's responsibilities lie entirely within the sphere of fiscal control and processing of accounts, whether it be for personnel wages, equipment rental or food supplies. This section is also responsible for daily fire costing and projection.

d. The Heavy Equipment Section is responsible for mobilizing equipment on the fireline, assessing and meeting the logistical needs to support machines and operators, and demobilizing.

2.5 Man-Up Criteria

Man-up is the allocation of initial attack resources based strategically within the forest(s) to increase attack strength and reduce the suppression time on fires. The goal of preparedness planning is to conduct initial attack on all fires before they reach a threshold size of 1.2 ha. This is called the "attack time size objective". The Intelligent Fire Management System (IFMIS) is used to determine the time lapse that will occur before a fire reaches its threshold size. The time lapse equates to the required attack time. The forest protection staff can quantitatively evaluate the deployment of fire control resources based upon the number of resources that are required to meet the attack time objectives for each area within the forest.

Attack time includes getaway and travel times of initial attack resources. Initial attack standard getaway times for aircraft are as follows:

- Immediate (3-5 minutes)
- 10 minutes
- 30 minutes
- 60 minutes
- Project status

Area by area fire behavior potential calculations are used to produce a map of the required attack times to meet the attack size objective. This map is referred to as the attack time objective, and is displayed in:

< 15 minutes
15 - 30 minutes

30 - 60 minutes
60 minutes plus

With this map the fire manager can see areas of concern (short attack times) when rapid initial attack is required to prevent fire escape.

Day-basing should be in place by 1100 hours during normal risk conditions. When there is potential for holdover fires or high risk is anticipated for the morning, day-basing and loaded patrols will commence earlier than normal. When there is no potential for ignition in the morning, day-basing can be delayed past 1100 hours but must be in place by 1300 hours. Stand-to and standby times are specifically set by the forest duty officer.

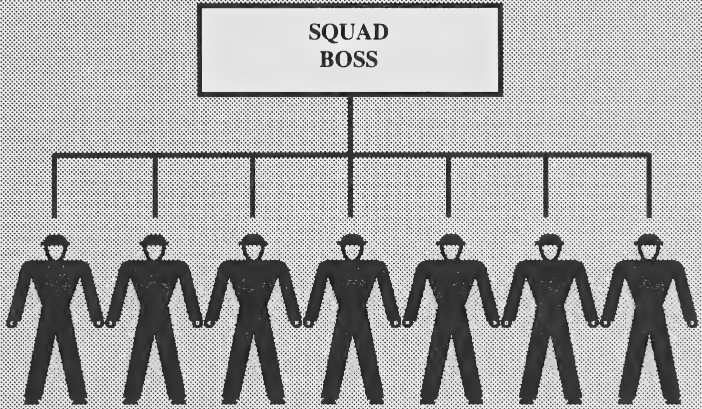
Day-basing of crews and helicopters on 3-, 5-, or 10-minute etc., getaway times are required in areas where no facilities exist. Generally, crews and helicopters return to an established camp for overnighting.

Helicopters that work long hours on fires or projects may be exchanged for helicopters on man-up. This should allow pilots a rest period and the engineer time to do maintenance on the machine.

CHART 7

L F S FIRELINE ORGANIZATION

SQUAD – 8 PERSONNEL



SQUAD
BOSS

7 FIREFIGHTERS

LFS FIRELINE ORGANIZATION

I – CREW FIRE – 25 BASIC PERSONNEL EXCLUDING OVERHEAD
(MAXIMUM LIMIT OF ORGANIZATION) – ONE CREW

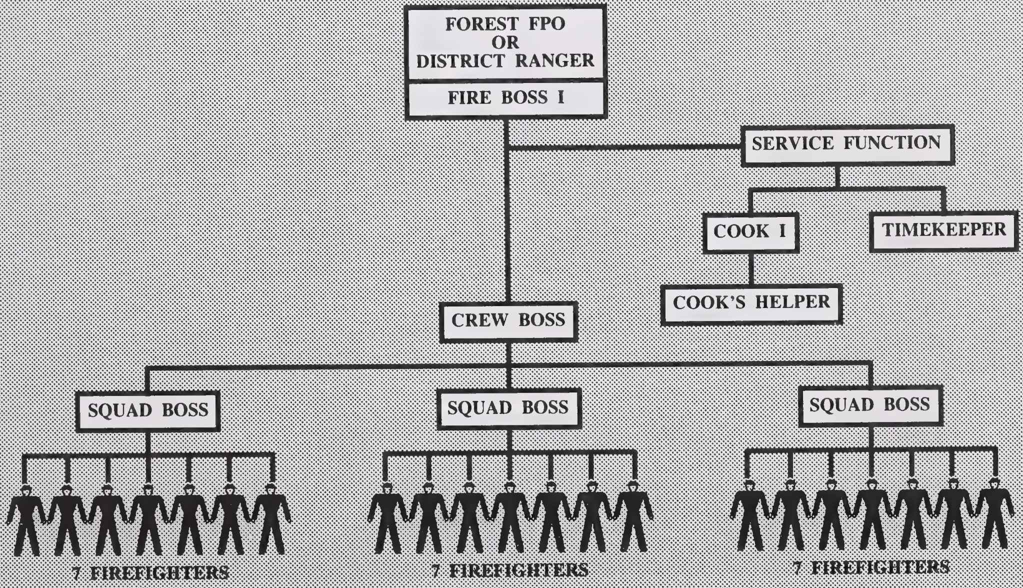


CHART 9

L F S FIRELINE ORGANIZATION

II – SECTOR FIRE – 75 BASIC PERSONNEL EXCLUDING OVERHEAD

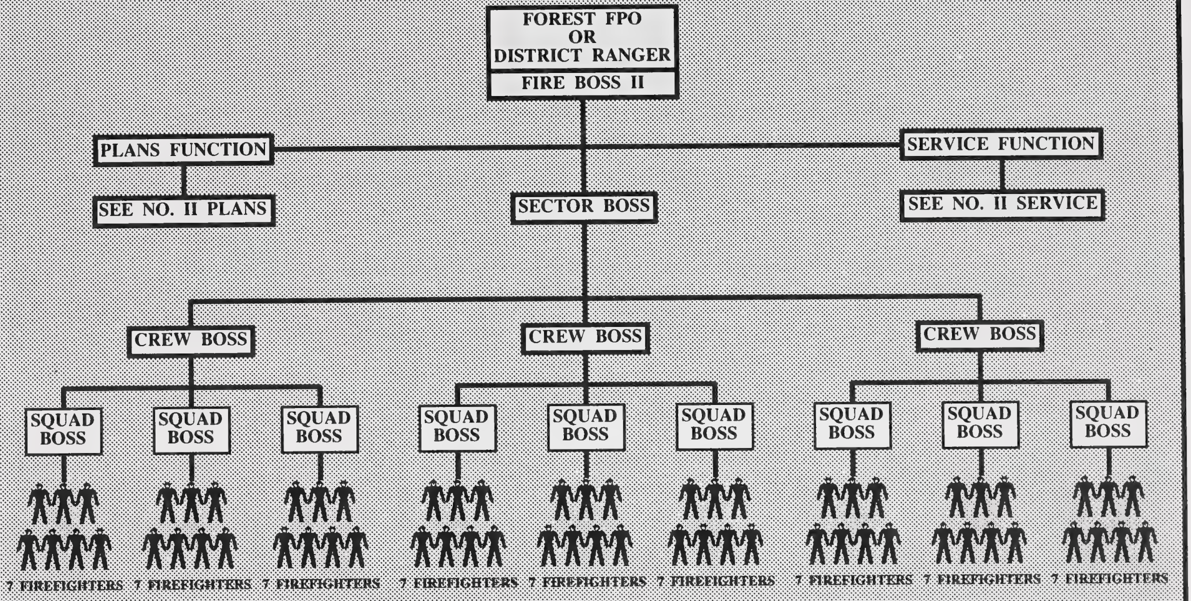


CHART 10

LFS FIRELINE ORGANIZATION

II – PLANS FUNCTION

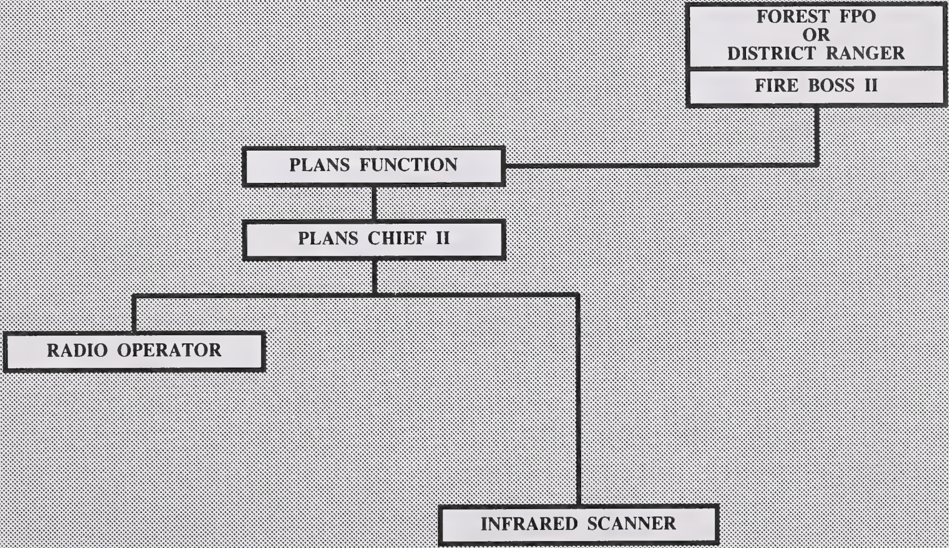


CHART 11

LFS FIRELINE ORGANIZATION

II – SERVICE FUNCTION

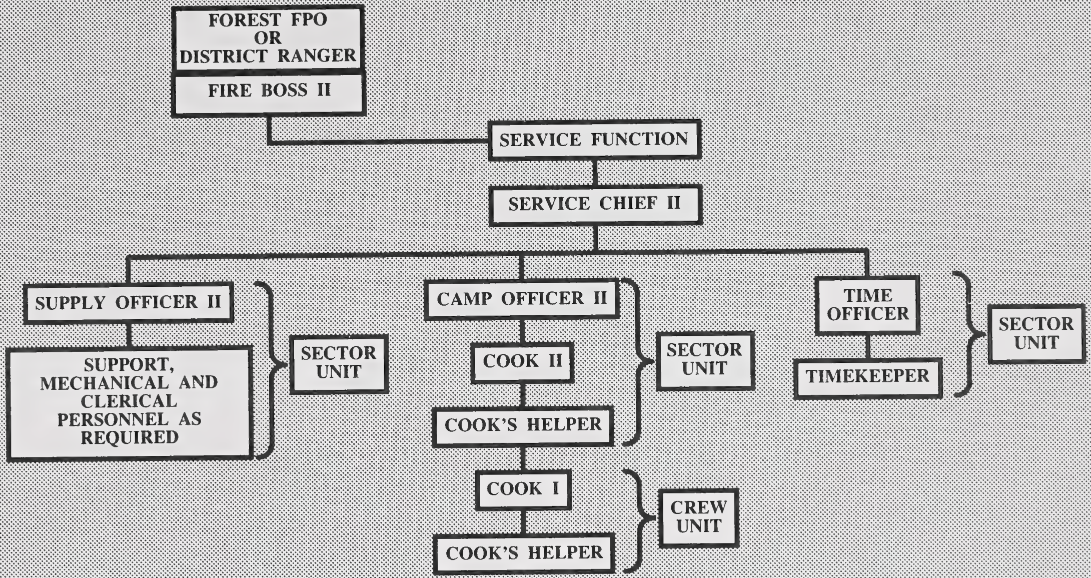


CHART 12

L F S FIRELINE ORGANIZATION

III – DIVISION FIRE – 225 BASIC PERSONNEL EXCLUDING OVERHEAD

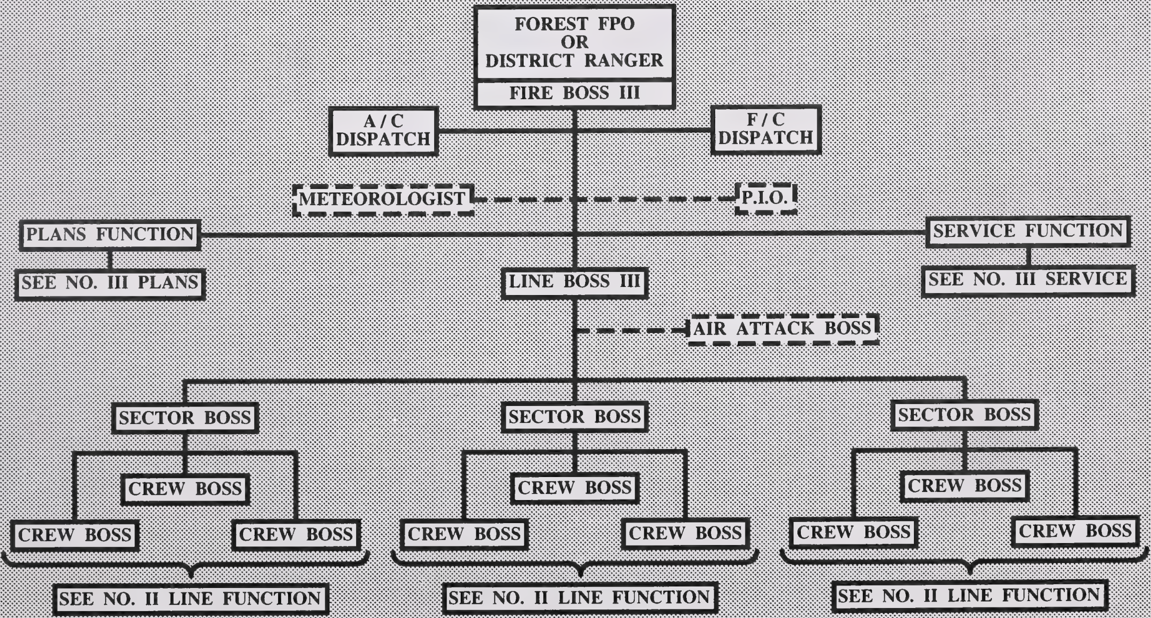


CHART 13

LFS FIRELINE ORGANIZATION

III – PLANS FUNCTION

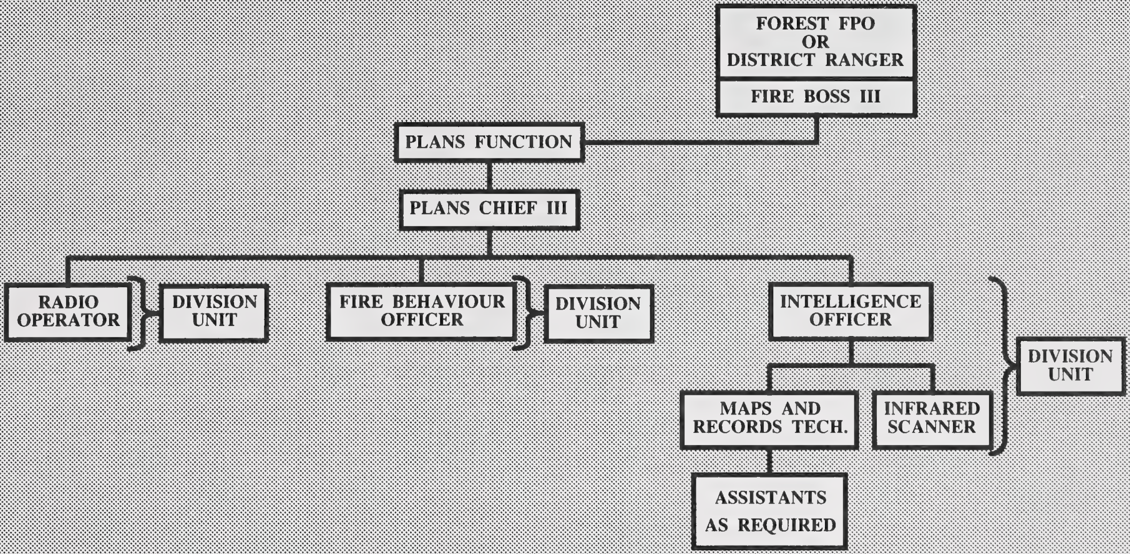
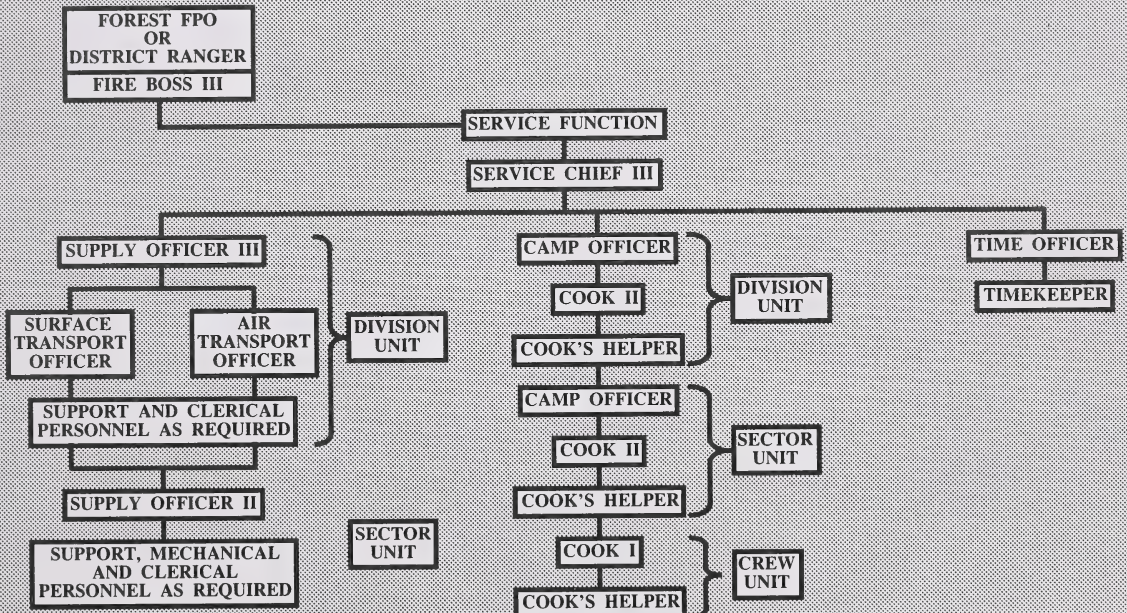


CHART 14

L F S FIRELINE ORGANIZATION

III – SERVICE FUNCTION



3. Helicopters

3.1 Minimum Standards for Hiring Helicopters

Helicopters having the following qualifications will be considered for short-term charter work:

1. A VHF/AM Transport Canada Communications radio covering the band 118.0 to 139.0 MHz with push to talk switch on the cyclic stick.

2. Must be equipped with one VHF/FM voice transceiver (Wulfsberg "Flexcom" or equivalent) with a minimum 10 channels UHF and 10 channels VHF, capable of transmitting and receiving over the bands 150-174 MHz and 406-420 MHz. In case of extreme need A/C will be accepted that have been wired to accommodate a "Converta-Comm" box that can be hooked up for UHF radio and antenna (roof mounted).
   Note: UHF must have sub-audible tone option (162.2 Hz Tx-Rx)

3. Should have a minimum of two (2) headsets.

4. Hour meter installed on rotor wing collective column that is activated when helicopter begins to lift off. Hour meter to be calibrated to show readings in hours and tenths of hours.

5. High skid gear with bear paws desirable.

6. Self cocking, automatic locking cargo hook with both manual and electrical release. Minimum two cargo nets and lanyards.

7. Approved water bucket for type of helicopter.

8. Convex mirror for pilots to observe sling loads.

9. One first aid kit.

10. One fire extinguisher.

11. White strobe light (must be visible from above) with an independent activating switch.

12. Painted, striped rotor blades preferred.

13. GPS unit desirable.

14. Should be equipped with Transport Canada-approved E.L.T.

3.2 Minimum Standards for Helicopter Pilots

1. Pilot must possess a current valid commercial pilot licence issued by Transport Canada, that is endorsed for the type of helicopter the pilot is operating.
2. Should have a minimum of 600 hours of rotary wing flying time. This may be waived after consultation with PFFC.
3. Previous experience in firefighting duties is desirable.

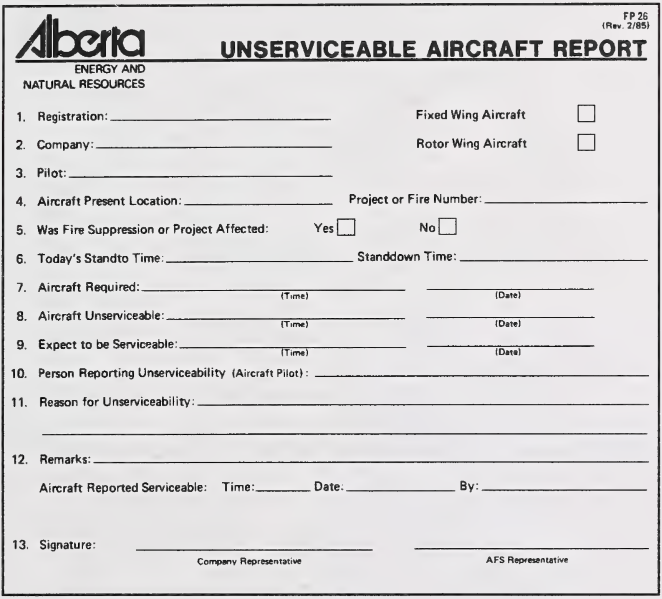
3.3 Pilot Responsibility

The pilot of any helicopter operating under the jurisdiction of LFS is responsible for:

1. Filing of flight plans and flight notifications in accordance with Transport Canada Regulations and LFS requirements. In case of conflict, Transport Canada Regulations take precedence.
2. Deciding on the composition, weight and stowage of any cargo. (List of weights for firefighting equipment Appendix 1).
3. Deciding on the suitability of weather conditions for flight.
4. Deciding if, and where, landings may be safely made.
5. Advising if relief pilot is required due to flight fatigue.
6. Being available and airborne within the standby times set by LFS.
7. Continuously monitoring specified LFS radio frequencies while in flight.
8. Passenger manifest i.e.; names must be reported to responsible dispatch.
9. Reporting position every 30 minutes while in flight. If landing for an extended period of time notify dispatcher.
10. Being prepared to remain overnight at fire camps.

11. At the completion of each day of operation, ensuring that time down for the night, total flying time and project breakdown are forwarded to forest or district communications centre for transmission to PFFC.

12. Reporting unserviceable aircraft to forest headquarters on form FP26. (Figure 1). This form should be completed by field staff and submitted to forest headquarters.



Alberta
ENERGY AND
NATURAL RESOURCES

FP 26
(Rev. 2/85)

UNSERVICEABLE AIRCRAFT REPORT

1. Registration: Fixed Wing Aircraft ☐
2. Company: Rotor Wing Aircraft ☐
3. Pilot:
4. Aircraft Present Location: Project or Fire Number:
5. Was Fire Suppression or Project Affected: Yes ☐ No ☐
6. Today's Standto Time: Standdown Time:
7. Aircraft Required: (Time) (Date)
8. Aircraft Unserviceable: (Time) (Date)
9. Expect to be Serviceable: (Time) (Date)
10. Person Reporting Unserviceability (Aircraft Pilot):
11. Reason for Unserviceability:
12. Remarks:

Aircraft Reported Serviceable: Time: Date: By:

13. Signature: Company Representative AFS Representative

Figure 1. Unserviceable Aircraft Report

3.4 Pilot Working Limitations

All pilots flying under the jurisdiction of the LFS will be limited to the flight hours as set out by the Air Carrier Operations manual or according to Transport Canada ANO VII, No. 6. Where hourly limitations established by the carrier are less than Transport Canada standards, the carriers limits will apply.

An air carrier shall set up a system that establishes maximum flight time, maximum flight duty time and a minimum rest period for the air carrier flight crew members for each 24 hour period in accordance with Transport Canada Regulations.

4. Briefings

Preflight briefing of passengers and pre-operation briefings of helicopter crews are required as part of safe and efficient helicopter operations.

4.1 Passenger Briefings By Pilot

It is in the best interest of pilots to ensure that all passengers are briefed before boarding or loading a helicopter. This briefing should cover the following points:

1. How to approach, enter and exit the helicopter.

2. How to open and close doors and external compartments..

3. Seatbelt location and use.

4. Passengers seating during the flight, no moving around or changing seats.

5. Takeoff and landings (do not distract the pilot).

6. How equipment is to be loaded and unloaded.

7. How to stow light equipment and loose articles in the area around the helicopter before take-off.

8. Caution on throwing items around helicopter.

9. Location of Emergency Location Transmitter (ELT) and how it can be activated.

10. Location of safety and survival gear.

11. Appropriate eye, ear and hand protection gear, during slinging operations.

12. Brief ground crew on safety procedures around helicopters.

13. How to protect the nose windows.

14. Emergency briefing procedures in event of a crash.

15. Smoking restrictions.

4.2 Pilot Briefings

4.2.1 Aircraft Hired by PFFC:

The provincial duty officer at PFFC will brief the company or pilot at time the helicopter is hired. Points to be covered are:

1. Terms and conditions of hire as per company tariff.
2. Minimum standards for hiring, pilot hours, working limits.
3. Extra flight gear required.

4.2.2 Briefing at Forest Headquarters:

The forest protection officer (FPO) and/or duty officer at forest headquarters will brief the company representative or pilot when the helicopter is hired (if hired within forest boundary) and its arrival at forest headquarters. This briefing may take place at a ranger station or a fire base if aircraft is from out-of-forest. Points to be covered are as follows:

1. Terms and conditions of hire.
2. Instructions on completing daily flight reports AO-02.
3. Use of LFS radio, including frequencies to be used and procedures.
4. Use of maps and explanation of Alberta Third System of Survey used by LFS. (Section 9.0)
5. Location of fuel caches and fuel dumps locations within the forest, and recording the amount of fuel taken. LFS refueling policy (Appendix 2).
6. Monitoring LFS radio frequencies, reporting time of departures (TDs), time of arrivals (TAs), total flying time (TFTs), and down for night time (DFN) at the end of each day.
7. Informing pilot of work assignment, project, man-up on fire, who he is to report to.
8. Review of LFS Helicopter Load Calculation sheet. Fill out according to instructions on inside cover of book (Appendix 3).
9. Floodlight kits are available if required for night servicing (i.e., lights, power plant, compressor).

5. Aircrew Camp Accommodations

5.1 Fire Suppression and Man-up Accommodation

When a helicopter is hired for fire suppression or man-up, food and lodging will be as described below.

5.1.2 Food

First day: aircrews should be prepared to look after themselves for a minimum of 24 hours. Food will be available.

Second Day: camp should be in place and meals prepared and supplied by LFS.

Third day and after: good-quality hot meals available; mealtime based on aircrew's schedule.

5.1.3 Tent

Standard LFS fireline tents will be used.

1. Tents will be set up correctly by LFS personnel in suitable locations.

2. There will be no more than two to a tent — this applies to aircrew only. Tents for these personnel will be set away from the noise of the main camp area.

3. Bedrolls, mattresses and mosquito bars will be supplied by the aircraft company.

5.1.4 Five-day guide

The following applies to man-up at remote secondary or lesser level staging. Where feasible, and at the discretion of the local FPO or chief ranger, the crew may travel to town facilities for a night. This does not apply to active fire camps.

5.1.5 Exceptions

On active fires or man-up, all aircrews are expected to remain at the base camp with the following exceptions:

1. When NO facilities as outlined above are available, and based on the fire boss's discretion, the aircrew may return to the closest overnight facility (i.e., staging camp at ranger station or closest town).

2. After 10 days on the fireline, the aircrew will be allowed to return to the closest town for clean-up and bed for the night. Thereafter, this

will occur every five days, depending on the fire, weather conditions and plan of action as determined by the fire boss.

3. Where operations are being conducted immediately adjacent to a ranger station, forest headquarters, commercial camp or facility, the FPO may authorize aircrews to use the facilities. Specified overhead may be allowed to use the facilities as well.

4. Aircrew will eat in the same camp setups as LFS staff on all fires and man-up operations.

5.2 Description of Facilities

5.2.1 Forest Headquarters

Any motel located in the same centre as a forest headquarters is acceptable.

5.2.2 District Ranger Headquarters

Any motel or bunkhouse located at or near the ranger station will be used. Check with district ranger staff for location of these facilities. If sleeping in a bunkhouse, bring your own sleeping bag. Qualified cooks are hired on a seasonal basis.

5.2.3 Primary Fire Base

The primary fire base is a permanent base usually designed as an all-season facility to hold from one to three crews. The base contains trailers and/or buildings. Some bases are integrated into the accommodation needs of the forest. During the off-season, the base may be used by timber management or recreation staff.

Permanent facilities include:

- sleeping quarters
- kitchen/dining quarters
- washing/laundry
- recreation facilities
- office unit

Other provisions expected at a primary fire base are:

- good access, all weather road and airstrip which is normally all weather
- good radio communications and power supply
- potable water
- cold storage facilities
- cooks

5.2.4 Secondary Fire Base

This type of fire base is used to accommodate fire crews for a short to medium time period at frequent intervals during the fire season. Crews held here will be used for either export or local needs.

The secondary fire base must accommodate one to three crews, pilots, overhead and auxiliary staff. Meals are prepared by qualified cooks. Conditions defining a secondary base include the following:

- sleeping quarters consists of tent frames complete with floors, space heaters are optional,
- permanent kitchen, dining and washing facilities,
- power,
- radio communications,
- potable water,
- cold storage facility,
- good access (most of the time),
- basic office facilities.

5.2.5 Remote Fire Base

Periodically during the fire season, a staging base is required for a short time to meet local needs. Normally it is located in strategic and remote areas as fire conditions dictate. The following minimum facilities must be provided at a remote base:

- attack centres not covered under helitack/initial attack primary or secondary fire bases would become remote fire bases,
- must be able to sleep from 10 to 30 staff under canvas using either tent frames or pre-cut tent poles,
- washing, kitchen and dining facilities are pre-built of either picnic tables or native materials, canvas or tarp for weather protection,
- no power,
- radio communication facilities are under canvas,
- helispot is precleaned,
- tent camp to accommodate fire crew and pilots,
- usually experienced cooks, but quality of meals may vary.

5.2.6 Day Base

A staging base is designed for day use as required, and has no pre-built facilities. It meets the following criteria:

- location is identified by legal description, and depends on where the hazard/risk is that requires personnel,
- the location is not associated with the existing 3-minute getaway centres,
- facilities used at a day base would be determined by local

requirements and materials, and may include a screened tent for insect protection and picnic tables.

When forward-basing to 3-minute getaway centres without facilities, the crew and helicopter will return to one of the facilities described previously for overnight accommodation.

Forest protection facilities not designed for holding firefighter crews include the following:

- Initial attack base
- Helitack base
- Airtanker bases, primary and secondary.

The initial attack and helicopter bases are primarily a single use concept. However, they are often integrated into the total accommodation needs of the forest and district.

5.2.7 Fire Base Camp

At a fire base camp, tents are used. On the first day, aircrew and other personnel may have to cook for themselves. On the second day, a cook will prepare all meals. Food is supplied by LFS.

5.2.8 Fireline Camp

Tents are used at a fireline camp, and it is a primitive setup. On the first day, personnel will have to prepare their own meals from canned food. On the second day, cooks will prepare the food.

6. Aircraft Accounts

6.1 Preparation and Submission of Aircraft Accounts

1. It is a departmental policy to charter aircraft only from those companies who submit an approved tariff as required by the National Transportation Act, 1987 and the Air Carrier Regulations. In cases of unusual fire emergencies, exceptions may be made.

2. Commercial aircraft operators who wish to supply aircraft to the department must submit a copy of their current and subsisting tariff. The department requires 48 hours advance notice, in writing, for all tariff revisions.

3. Payment of aircraft accounts is based on the Alberta Flight Report Form AO-O2, which must be completed and certified by the appropriate authority before submitting for payment. The Land and Forest Services personnel approved to certify a flight report are:
   a. all permanent staff,
   b. seasonal staff — helitack and initial attack crew leader, party chiefs, sector bosses and forest aircraft dispatchers,
   c. air attack officers,
   d. airtanker base manager,
   e. aerial observers, and
   f. project forest officers and foresters.

4. Flight report forms AO-02 are available upon request from any LFS office, or from the PFFC Aircraft Operations.

5. Accounts will be paid according to the company's current and subsisting tariff on file with the department. A separate invoice is required for each aircraft registration. It is preferred that invoices be submitted for each aircraft for a period of up to two weeks. However, companies can submit invoices for each day, or a combination of days. When a company supplies fuel, and in turn these charges appear on the invoice, supporting verification of fuel purchased must be attached to the invoice. This information is required by our accounts section so that a refund of the Federal Excise Tax on aviation fuel can be applied for.

6. LFS is not responsible for any claims not covered by a valid tariff, such as:
   a. pilot's or engineer's laundry or dry cleaning,
   b. long-distance telephone calls between company personnel and their company office, or vice versa, and

c. traffic or parking tickets.

7. Company invoices for chartered, leased or contracted aircraft or airtanker aircraft must be addressed to:

   Director, Forest Protection Division
   Provincial Forest Fire Centre
   Land and Forest Services
   Alberta Environmental Protection
   Box 7040, Postal Stn. "M"
   Edmonton, Alberta T5E 5S9

   For hand delivery, the office is located at:
   10725 - 120 Avenue, Edmonton, Alberta.

   or to Regional (Forest) Headquarters. Please confirm at time of hire.

   The following documents must accompany the invoice:
   a. the original plus two copies of the invoice,
   b. one copy of the Company Flight Sheet, Operation Report or Charter ticket; and
   c. the original (white) copy of a properly completed and certified Alberta Government Flight Report AO-02 for each day's operation.

8. No changes will be permitted on the Flight Report AO-02 after certification. Changes made prior to certification must be initialed by the appropriate authority.

9. Invoices completed improperly or submitted without the properly signed supportive documents, (i.e., AO-02) will be returned to the company. This could result in a delay of payment.

10. Persons certifying the Alberta Government Flight Report should check all entries to make sure they are correct before signing the document.

6.2 Board and Lodging

All pilots, co-pilots and engineers eligible for subsistence payments under this section must have their company submit claims using the following guidelines:

1. Claim only when away from home base.

2. Do not charge accommodations to the LFS. Payment must be made by the aircrew and a receipt obtained.

3. In the event of a sudden base change where the crew pays lodging expenses at two locations, a written explanation with receipts verifying the expenditures must accompany the invoice when it is submitted for payment.

4. If part or all of an aircrew stays at an LFS camp where meals are provided, the number of meals eaten must be identified on the AO-02 at the end of each day. A per diem claim will not be paid. This includes meals supplied to engineers at fire camps.

5. When contracted aircraft crews are unable to stay at an LFS facility, crews can either obtain receipts or claim the Alberta per diem rate.

6. When contract or chartered aircraft crews are provided with occasional meals at an LFS camp, there is no charge for the meal. In these cases the normal per diem rate must be reduced accordingly.

7. Charter aircraft crews will be reimbursed for the full cost of board and lodging upon producing receipts. If no receipts are produced, they can claim the approved per diem rate. Other expenses incurred, such as car rental and taxi fares must have supporting receipts.

6.3 Alberta Government Flight Report AO-02

Before a flight begins, it is the responsibility of LFS to provide the pilot with the correct project and charge codes to which the flight is to be charged. A list of project codes is printed on the cover of the Alberta Government Flight Report book, AO-02.

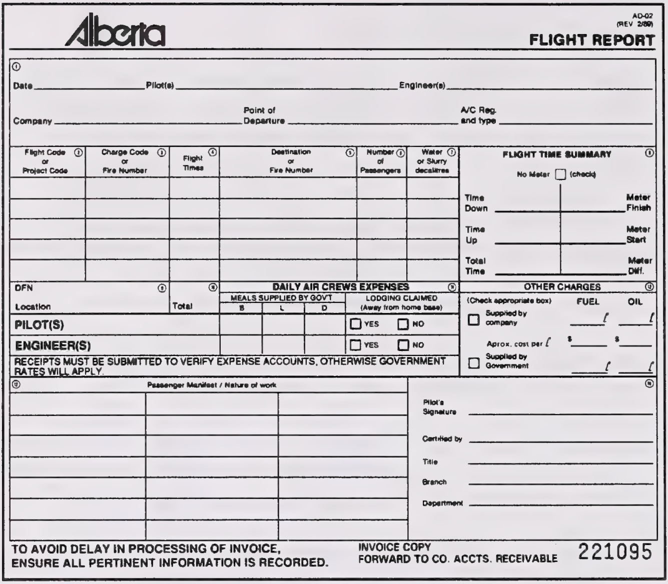
The flight log is self-explanatory. The points to be emphasized are listed below.

1. Ensure the flight report is signed by an authorized person.

2. Flight times must correspond with those reported to the dispatcher.

3. Ensure the section on fuel and oil is filled out and agrees with the company flight ticket.

4. No changes are permitted on the flight report unless they are initialed by the certifying officer.



Alberta

AO-02
(REV 2/89)

FLIGHT REPORT

①
Date ______ Pilot(s) ______ Engineer(s) ______
Company ______ Point of Departure ______ A/C Reg. and type ______

Flight Code or Project Code ②	Charge Code or Fire Number ③	Flight Times ④	Destination or Fire Number ⑤	Number of Passengers ⑥	Water or Slurry decalitres ⑦

FLIGHT TIME SUMMARY ⑧
No Meter ☐ (check)
Time Down ______ Meter Finish
Time Up ______ Meter Start
Total Time ______ Meter Diff.

DFN ⑨
Location
Total ⑩

DAILY AIR CREWS EXPENSES ⑪	MEALS SUPPLIED BY GOV'T B	L	D	LODGING CLAIMED (Away from home base)
PILOT(S)				☐ YES ☐ NO
ENGINEER(S)				☐ YES ☐ NO

RECEIPTS MUST BE SUBMITTED TO VERIFY EXPENSE ACCOUNTS, OTHERWISE GOVERNMENT RATES WILL APPLY.

OTHER CHARGES ⑫ (Check appropriate box)	FUEL	OIL
☐ Supplied by company	______ ℓ	______ ℓ
Aprox. cost per ℓ	$______	$______
☐ Supplied by Government	______ ℓ	______ ℓ

⑬ Passenger Manifest / Nature of work

⑭
Pilot's Signature ______
Certified by ______
Title ______
Branch ______
Department ______

TO AVOID DELAY IN PROCESSING OF INVOICE, ENSURE ALL PERTINENT INFORMATION IS RECORDED.

INVOICE COPY
FORWARD TO CO. ACCTS. RECEIVABLE

221095

Figure 2. Sample of Flight Report AO-02

6.3.1 Flying Time and Metric Conversion Tables

Flight Time: When determining the duration of a flight, fractions of an hour are rounded to the nearest multiple of six minutes and expressed as decimals of hour.

0 - 2 mins. = 0.0
3 - 8 mins. = 0.1
9 - 14 mins. = 0.2
15 - 20 mins. = 0.3
21 - 26 mins. = 0.4
27 - 32 mins. = 0.5
33 - 38 mins. = 0.6
39 - 44 mins. = 0.7
45 - 50 mins. = 0.8
51 - 56 mins. = 0.9
57 - 60 mins. = 1.0

Metric Conversions

Distance

Imperial	Metric	Metric	Imperial
1 inch	2.540 cm	1 cm	0.3937 inch
1 foot	0.3048 m	1 m	3.281 feet
1 yard	0.9144 m	1 m	1.094 yards

1 rod	5.029 m	1 m	0.20 rod
1 mile	1.609 km	1 km	0.6214 mile

Capacity

Imperial	Metric	U.S.	Metric
1 pint	0.568 litre	1 pint (US)	0.473 litre
1 quart	1.137 litre	1 quart(US)	0.946 litre
1 gallon	4.546 litre	1 gallon (US)	3.785 litre
1 fl. oz.	28.41 ml	1 barrel oil	158.99 litre
1 litre	1.76 pints	1 cup 8 fl.oz.	227 ml
1 litre	0.220 gallon		
1 litre	0.88 quart		

Weight

Imperial	Metric	Metric	Imperial
1 ounce (avoir)	28.350 gm	1 gm	0.035 ounce(avoir)
1 pound (avoir)	453.592 gm	1 kg	2.205 lbs (avoir)
1 ton (short) (2000 lb)	0.907 tonne	1 tonne	1.102 ton (short)

1 tonne = 1000 kilograms

7. Flight Emergencies

7.1 Aircraft Accidents and Missing Aircraft

When an accident occurs involving any aircraft flying under the jurisdiction of the LFS, the following procedures are to be applied:

7.1.1 Responsibility

1. The pilot-in-command, the owner or LFS representative shall, as soon as possible and by the quickest means of communication available, report details of the aviation occurrence to the operations dispatcher in Edmonton at 427-6807.

2. The operations dispatcher shall notify the Transportation Safety Board of Canada, followed by the Director of Forest Protection Division and the contract aviation safety officer.

3. The Director notifies the Assistant Deputy Minister of LFS.

7.1.2 Schedule A

Specific information to be reported on aircraft accidents:

1. type, model, nationality and registration marks of the aircraft;
2. name of owner, operator and hirer, if any, of the aircraft;
3. name of pilot-in-command;
4. date and time of the accident (please specify when daylight savings time applies);
5. last point of departure and the point of intended landing of the aircraft;
6. position of the aircraft by:
    a. latitude and longitude,
    b. reference to some easily defined geographical point,
    c. Alberta Third System of Survey;
7. number of crew members aboard, and how many were killed or sustained serious injury;
8. number of passengers aboard, and how many were killed or sustained serious injury;
9. description of the accident and the extent of damage to the aircraft;
10. detailed description of any dangerous goods aboard the aircraft; and
11. the name and address of the person making the report.

7.1.3 Schedule B

Specific information to be reported on aircraft missing while on a flight:

1. type, model, nationality and registration marks of the aircraft;
2. name of owner, operator and hirer, if any, of the aircraft;
3. name of the pilot-in-command;
4. date and time of the last known take-off point and destination of the aircraft (please specify when daylight savings time applies);
5. last known position of the aircraft;
6. names and addresses of crew members and passengers aboard the aircraft;
7. action being taken to locate the aircraft;
8. a detailed description of any dangerous goods aboard the aircraft; and
9. name and address of the person making the report.

An aircraft flying under the jurisdiction of LFS shall be considered missing when:

1. the calculated flying time from a reported position to the next reporting point is exceeded by 50% or 30 minutes, whichever is longer; or
2. the estimated time of arrival (ETA) is exceeded by 50% of the calculated flying time enroute, or 30 minutes, whichever is longer; or
3. on local project work there has been no communication with the aircraft for one hour; or
4. on local project work where the pilot has indicated an extended period of silence, due to poor communication reliability, i.e., on the ground, waiting for personnel, etc. and the indicated period is exceeded by one hour.

8. Communications

All pilots of aircraft operating under the jurisdiction of the Department of Environmental Protection are required to file a flight plan with LFS. If this cannot be done, or adequate communications are not provided, a flight plan must be filed with a Transport Canada Flight Service Station.

Land and Forest Services uses a central dispatching system, with control points in the field at forest headquarters where direct communication links to provincial headquarters operations dispatcher are maintained.

8.1 VFR Flight Plans

1. For flights originating from Edmonton, flight plans may be filed with PFFC duty officer either by telephone (427-6807) or by radio on 122.9 MHz.

2. For flights originating from points within Alberta other than Edmonton, flight plans will be filed at forest headquarters or the nearest LFS office (i.e., ranger stations, lookout towers or forest headquarters duty officer).

3. Pilots on an LFS flight plan will continuously monitor LFS radio frequencies and report their position every 30 minutes.

4. When each day's operations is completed, pilots must forward the time down for the night, total flying time and project breakdown to the appropriate communications centre.

See Appendix No. 4 for Daylight Flying Under Visual Flight Rules.

8.2 PFFC Duty Officer

1. During the fire season (April 1 to October 31), a shift schedule will be set up that may require the PFFC duty officer to be on 24-hour call depending on the fire situation.

2. The duty officer on duty can be reached by telephone either at the office or his residence.

3. Before each shift change, the roster for operations dispatcher will be forwarded to forest headquarters by teletype.

Note: The office phone number for the duty officer on shift is 427-6807. After normal work hours, call 427-FIRE (427-3473).

8.3 Loss of Communications - Aircraft

It is LFS policy that loss of radio communications in any aircraft, whether government-owned, contracted or chartered, makes the aircraft unusable. It is to be removed from service until the problem is rectified.

Radio communications means an air-to-air capability (Unicom) and air-to-ground capability. Failure to make sure both forms are operating has resulted in several near misses in combined air operations over fires. This situation is especially dangerous when large numbers of aircraft are hired on casual charter to work on a fire. Aircraft will not be deployed on fires if they do not have adequate communications capabilities.

Pilots of aircraft hired on casual charter for use on forest fires must be thoroughly briefed on LFS policies and procedures pertaining to radio communications before being deployed on the fire. Particular emphasis should be placed on air space control procedures.

8.4 Air Traffic Control Over Fires

When more than one aircraft, (i.e., rotary wing, fixed wing or a combination of both) are employed on a fire, the air space over and surrounding the fire is classified as a restricted air space. All aircraft, whether rotary or fixed wing, proceeding to fires will monitor frequency 129.800 MHz primary. If there are multiple fires in area, then aircraft can use 128.950 MHz as an alternate.

All flight paths between points within a restricted air space must be coordinated to eliminate the possibility of collision under poor visibility conditions.

When approaching a fire where airtankers are deployed, aircraft pilots must contact the birddog aircraft 20 miles from the fire, report their location and request permission to enter the controlled airspace.

Note: Special authority is required for entry into DND Air Weapons Range, Cold Lake. This must be arranged and coordinated through the Lac La Biche forest protection officer (duty officer). The forest protection officer will inform the pilot of the approved penetration point and any restrictions to be observed.

8.5 Responsibility of Air Attack Boss/Air Attack Officer

When airtankers are deployed on fires, the air attack boss/air attack officer is responsible for controlling air traffic over, and in the immediate vicinity of wildfires. He also assigns the area of operations for each aircraft or groups of aircraft according to time, sector, division, route or holding area. In the absence of both the air attack boss and the air attack officer, this responsibility is assumed by the line boss or, in his absence, the fire boss.

All incoming aircraft must receive clearance from the air attack boss and/or air attack officer, line boss or fire boss before entering within five miles of the fire perimeter or as amended by issuance of a NOTAM (notice to airmen). Pilots must also receive their assigned area of operations.

Note: Calgary, Edmonton, Grande Prairie, Peace River, Fort McMurray, Fort Chipewyan and Footner Lake all have controlled or semi-controlled airspace. Air operations carried out in proximity of these areas must have prior approval from the local controller.

When a birddog aircraft is working over a fire, there is a Positive Control Zone. This is a specified airspace extending to an elevation of 3,000 feet AGL. When airtankers are working a fire in this zone, all instructions from the air attack officer are to be followed closely. The airspace in use may extend beyond these parameters and will be included in a NOTAM.

NOTE: LFS acknowledges the excellent cooperation and professional manner in which rotary wing aircrew set up a good check with one another on fires. They have an excellent record of good, safe coordination among themselves.

All flight coordination, especially on large fires, should involve discussion with rotary-wing pilots in an effort to ensure a workable and safe system.

8.6 Communications Guide

The pilots' communication guide form FP180 (pocket-sized cards) showing all forest frequencies, stations, channels and VHF/AM frequency allocations are available upon request at forest headquarters.

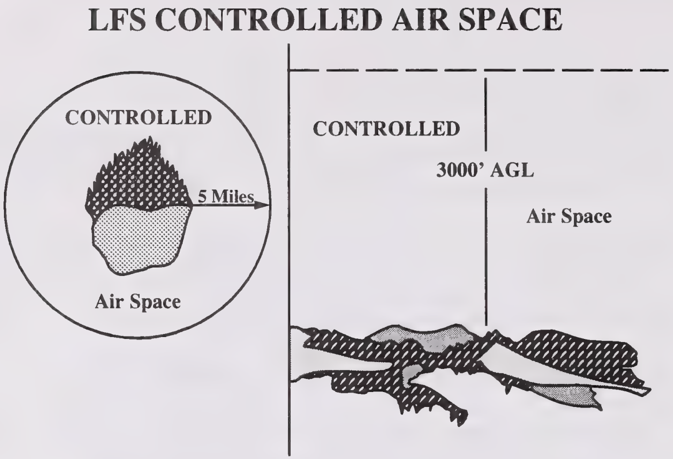


Figure 3. LFS Controlled Airspace

9. Alberta Third System of Survey

Maps produced and used by LFS emphasize the township grid system as the major reference system. Compared with the latitude-longitude system, which denotes a point at the intersection of two lines, the township grid system denotes an area of known size located in a certain position.

Subdivision

The smallest regular unit of land in Alberta is a legal subdivision (abbreviated LS or LSD). This unit is square, being one-quarter mile (0.4 km) in length and width, containing 40 ac. (16.2 ha, 1 acre = 43,560 sq. ft. or 4,047 m^2).

Section

Sixteen legal subdivisions make up 1 section (abbreviated SEC), the key unit of the township grid system. It is a square measuring 1 mi. at each side and containing approximately 640 ac. (259 ha). Figure 4 shows how each legal subdivision within a section is numbered.

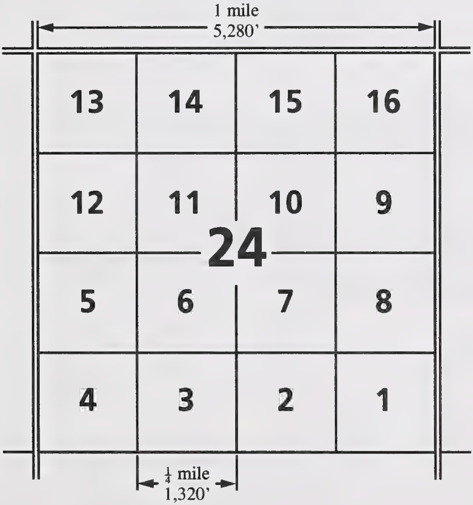


Figure 4. Legal Subdivisions

Quarter Section

Four legal subdivisions form 1 quarter section. These are identified as NE ¼, NW ¼, SE ¼, SW ¼ (see Figure 5).

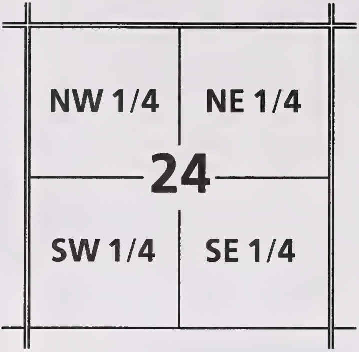


Figure 5. Sections Divided Into Quarter Sections

Township

A township is a square with 6-mi. sides, and contains 36 sections (abbreviated Tp. or Twp.). Sections within a township are arranged and numbered as shown in Figure 6. The numbering starts in the SE corner of the township. The area of a township is that of 36 sq. mi. (57.9 km^2) plus the width and length of the road allowances.

A standard government road allowance, 66 ft. (20 m) in width, is left between sections in the pattern shown in Figure 6. Section boundaries that are not road allowances are called “blind lines”.

Figure 6 shows clearly that road allowances are provided after each mile in an east-west direction; i.e., five north-south road allowances within the township in a north-south direction, with three blind lines forming the remaining section boundaries.

Each Township is identified by two numbers, which indicate its position geographically. These are township number and range number.

Township Strips

A township strip runs in a east-west direction. Starting at the United States border, parallel strips 6 mi. wide are numbered consecutively from the south to the north. Strip #1 borders the Unites States, while strip #126 borders the Northwest Territories. Each strip constitutes a series of township squares.

Township Range

The range (abbreviated Rge.) numbering starts immediately west of a meridian, and increases in 6 mi. blocks (one township) as it goes west,

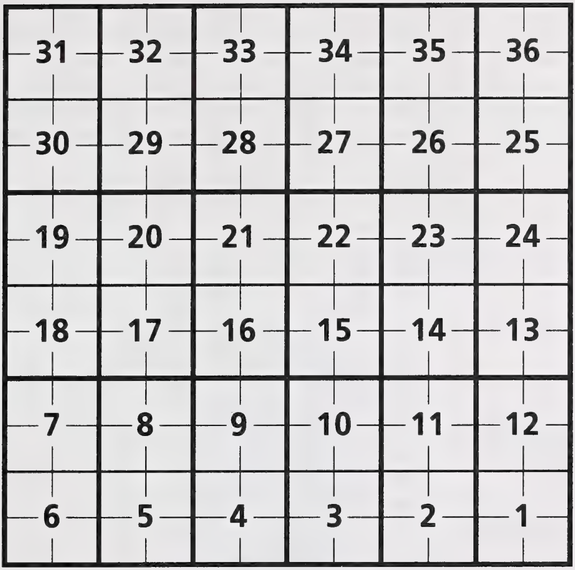


Figure 6. Sections Within a Township

Thus, the township marked * in Figure 7 is numbered Township 3, Range 2 West of the Fourth Meridian of in short form, TP. 3, Rge. 2 W4M.

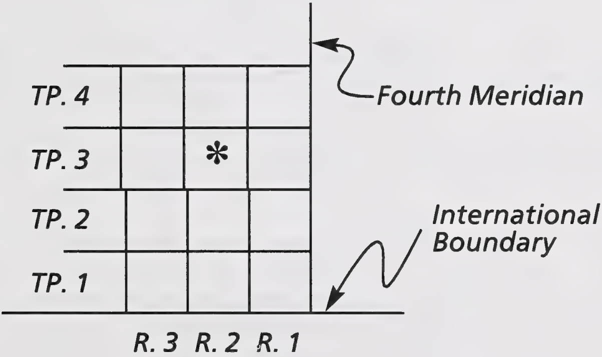


Figure 7. Township Range Identity

Meridian

The line from the north pole to the south pole by the shortest route is called a meridian (Figure 8). These lines are used as basic starting points for distances measured east and west. In Canada, these meridians have been arbitrarily numbered from 1 to 6. The first ("principle") meridian is located just west of Winnipeg; the second is on the Saskatchewan-Manitoba border; the third is in Saskatchewan; the fourth on the Alberta-Saskatchewan border; the fifth runs through Stony Plain, Alberta, and the sixth through a point just east of the townsite of Jasper.

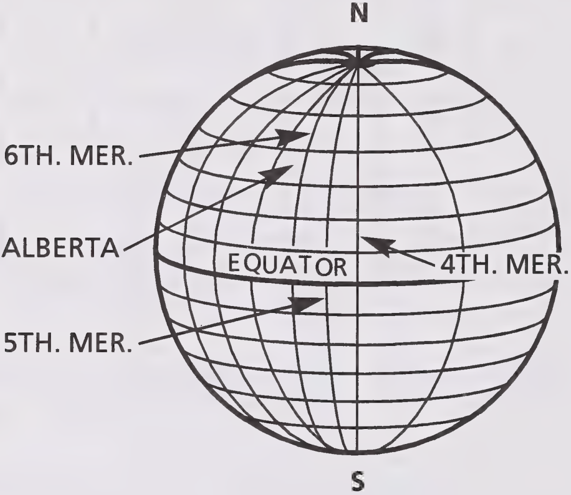


Figure 8. Meridians

Ranges are always referred to as being west of one of these meridians and the range numbering resumes with "1" west of each meridian.

Correction Lines

Townships are always slightly tapered towards the north because the earth is round. Around Edmonton, this tapering means that the south of the township is about 65 ft. wider than the northern boundary. Sections at the northern boundary of a township are about 10 ft. narrower than those at the southern boundary of the same township. To prevent this convergence from becoming too great, a break is made every four townships (Figure 9). This break is called a correction line and is not, as may be supposed, the result of a surveyor's error. Note that the jog at the correction line becomes greater the further west you move from the meridian. Just east of the next meridian to the west, this jog is greater than 1 mi.

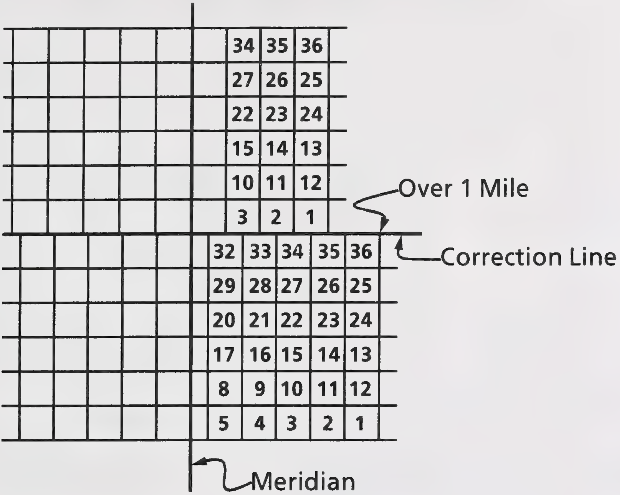


Figure 9. Correction Lines

At the meridian, all townships are cut off to the straight, geographic north-south line and a fresh start is made. This results in fractional townships and fractional sections (Figure 10).

Finding a Location based on a Legal Description

When a legal description is received over the radio, the reverse procedure for transmitting is followed to find it on the map:

1. Find the meridian.
2. Find the township at the intersection of the range column and the township strip.
3. Find the section with the township template.
4. Find the quarter section or legal subdivision.

For example, suppose you are told to proceed to LSD 8 of Section 10, Twp. 24, Rge. 8, W5M. First you would locate the 5th meridian. The location you want will be west of this meridian. Next locate the range by using the range numbers that are usually located horizontally along the top and bottom of the map. Then locate the township (township numbers are

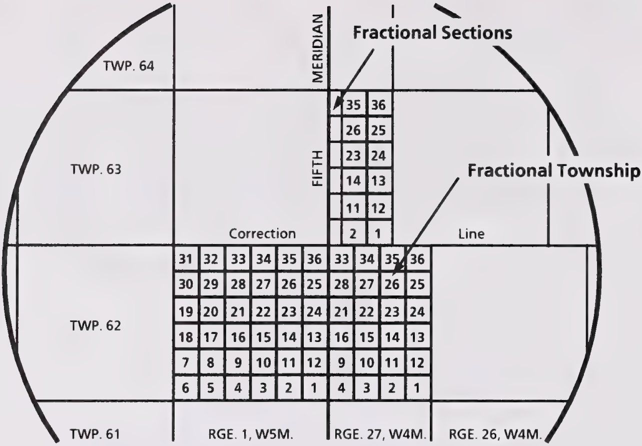


Figure 10. Fractional Townships and Fractional Sections

usually located vertically along the sides of the map). Finally locate the section number, then the legal subdivision.

APPENDIX 1

List of Weights for Firefighting Equipment

	Lb	Kg
AXE		
Single bit, standard fireline	5.0	2.3
BAG		
Backpack, Water c/w shoulder straps, filler cap and strainer	4.0	1.8
Backpack, water, Wajax	7.0	3.2
Sleeping disposable LFS	4.0	1.8
BOTTLE		
Propane (20 pound) full	45.0	20.4
Propane (100 pound) full	180.0	81.6
CAMPAIGN, service system	2702.0	1225.6
CAN, Gas plastic 5 gal	2.0	1.0
FOAM SYSTEMS		
Pump foam system	60.0	27.0
Remote foam system	23.0	10.0
Tanker foam system	25.0	11.0
Small pump foam system	32.0	14.5
HAT		
Safety, hard	1.0	0.45
HEATER		
Airtite, 18"	12.0	5.4
24"	15.0	6.8
HELI-TORCH		
LFS model	170.0	77.1
Simplex model	140.0	63.5
HOSE		
Fire, 1" per 100' (dry)	8.0	3.6
1½" per 100' (dry)	11.0	5.0
Suction, 2"	15.0	6.8
Suction, 4" X 10"	31.0	14.1

KIT		
First Aid, squad	4.0	1.8
First Aid, crew	7.0	3.2
First Aid, sector	22.5	10.2
First Aid, medic	7.5	3.4
Account crew	12.0	5.4
Camp maintenance	10.0	4.5
Fire management	130.0	59.0
Basic crew firecamp (without fire line tools)		
without tents	223.0	101.2
with tents	679.0	308.0
Basic squad fireline equipment	73.0	33.1
Base camp construction	180.0	81.6
Equipment for Wajax, MR-75 complete with engine and pumps with wooden box	545.0	24.0
Equipment MK III c/w engine and pump	117.0	53.1
Tool set maintenance for MK III	2.5	1.1
Equipment, chainsaw c/w saw (med. size)	46.0	20.9
Equipment for storage bladder for Jet Fuel 1600 imperial gallons with wooden box	560.0	254.0
Equipment for storage bladder for Jet Fuel 5000 imperial gallons with wooden box	620.0	281.2
Mess, crew size	116.0	52.6
Equipment for dispenser aerial incendiary c/w the machine	95.0	43.1
LIGHT		
Flood system	75.0	34.0
PAIL		
Canvas, water	1.0	0.4
POLYTHENE		
4.0 mill clear roll, 100 ft.	22.0	10.0
POWER PLANT Honda		
300 W	50.0	22.7
500 W	57.0	25.9
Remote foam systems		

PULASKI (Collins)	5.0	2.3
(F.S.S.)	5.5	2.5
PUMP		
Floating	42.0	19.0
Fuel hand barrel (Rotary)	18.0	8.2
Handspray, Wajax	3.0	1.4
Aircraft fueller, portable	326.0	147.9
RAKE		
Firefighting	4.0	1.8
SAW (Power, chain, medium size)		
Brand: Homelite	17.0	7.7
Husqvarna	16.0	7.3
Pioneer	16.0	7.3
Poulan	17.0	7.7
SAW (Swede)		
36"	1.0	0.4
48"	4.0	1.8
SEALDRUM SYSTEM with drum Sealdrum fuel 250 gallon (collapsible rubber drum) with wooden box	395.0	179.2
SHOVEL		
Round point, long handle	4.5	2.0
SHOWER		
portable 11' X 6"	455.0	206.4
STOVE		
Cook, 3 burner Coleman	16.0	7.3
Cook propane portable LFS	75.0	34.0
TANK		
Fuel fire pump 4 gallon	8.0	3.6
Helicopterable Firefighting Fireflex		
(60 gallon)	10.0	4.5
(110 gallon)	12.0	5.4
(300 gallon)	35.0	15.9
Portable self-supporting water reservoir (1500 gallon) c/w ground pad	77.0	35.0

TENT		
Disposable 12' X 14' (plastic)	22.0	10.0
Fabric, Weatherport, aluminum frame 10' X 20' with wooden box	415.0	188.2
Canvas 12' X 14'		
twill	36.5	16.6
duct	70.0	31.7
Canvas modular with wooden box	770.0	349.3
Pumpkin 18' (Habitat) with wooden box	525.0	238.1
TORCH		
Brush burning drip	5.0	2.3
AVIATION GAS - (e.g., 100LL) one imperial gallon	7.2	3.3
JET FUEL - (JP-4 etc.) one imperial gallon	8.02	3.6
OIL - (Aeroshell 80 etc.) one imperial gallon	9.0	4.1
WATER - one imperial gallon	10.0	4.5
KNOTS - one knot = 1.15 mph		
PASSENGERS - one passenger is considered at	182.0	82.6

APPENDIX 2

Refueling of Helicopters

Refueling of helicopters can be carried out from:

- Commercial outlets
- LFS underground tanks, where available
- LFS bowsers
- LFS fuel tankers c/w pump units
- LFS fuel bladder system
- LFS fuel drums

Although LFS makes every attempt to keep fuel clean and current, the pilot is responsible for ensuring the fuel is the proper, appropriate type for the aircraft, and is free from foreign material.

Refueling policy

1. Pilots should use older fuel first. The bungs on drums not totally emptied should be tightened and the date on which the drum was opened marked on top plus the aircraft registration number. This information will be useful next time the fuel cache is used.

2. LFS personnel shall not refuel helicopters.

3. During refueling operations, LFS personnel will leave the aircraft until refueling has been completed.

4. Hot refueling of helicopters is not recommended, and should not be done except in cases of extreme emergency and then only at the pilot's discretion.

5. LFS personnel have no authority to refill drums from bulk sources.

6. Pilots can refuse to allow helicopters to be refueled from unsealed or improperly sealed drums.

7. Pilots using fuel from their own source should indicate this on the flight log AO-02. Fuel charges will be reimbursed by LFS, providing supporting documentation is attached (legitimate invoices).

8. Full or partial drums should be stored lying down with the top of the

drum slightly lower than the bottom. This reduces the chance of the fuel becoming contaminated with water.

9. No fuel is to be deliberately dumped onto the ground.

10. All fuel spills are to be reported immediately to the nearest LFS office.

NOTE: No person shall smoke or have an open flame within 15 m (50 ft.) of the aircraft.

Oil: LFS no longer supplies oil. Companies should either invoice LFS based on actual invoices, or in accordance with their published tariff. Where no rate has been included in the tariff, the company must advise LFS in writing of the oil charge and the method used to calculate such charge.

APPENDIX 3

Weight/Load Calculation

Land and Forest Services has printed, in book form, "Helicopter Load Calculation" sheets. These should be filled out according to the instructions shown on the inside cover of the book.

NOTE: Final responsibility and load calculations must be agreed to by the pilot before the flight.

APPENDIX 4

Daylight Flying Under Visual Flight Rules

When aircraft are chartered by LFS for various projects, the following rules and definitions will apply:

Daylight and Darkness Calculations

1. Daylight is defined as, in respect of any place in Canada, the time in any day when the centre of the sun's disc is less than six degrees below the horizon, and in any place where the sun rises and sets daily, it may be considered to be the time commencing one-half hour before sunrise and ending one-half hour after sunset.

2. Night is defined as, in respect of any place in Canada, the time when the centre of the sun's disc is more than six degrees below the horizon; in any place where the sun rises and sets daily, it may be considered to be the time commencing one-half hour after sunset and ending one-half hour before sunrise.

3. Subject to satisfactory visibility and atmospheric conditions, aircraft flying VFR operation under the jurisdiction of LFS may fly between the hours of one-half hour before sunrise and one-half hour after sunset. Outside this time the aircraft must be on the ground.

4. To obtain sunrise and sunset times for any particular area in Alberta, contact the district dispatcher or the forest headquarters dispatcher.

APPENDIX 5

Glossary of Fire Terms

Aerial Detection: A system for, or the act of discovering, locating, and reporting wildfires from aircraft.

Aerial Ignition: The ignition of fuels by dropping incendiary devices or materials from aircraft.

Airtanker: A fixed-wing aircraft fitted with tanks and equipment for dropping suppressants or retardants on fire. Airtanker groups are a provincial resource.

Canadian Forest Fire Behaviour Prediction (FBP) System: A subsystem of the Canadian Forest Fire Danger Rating System. The FBP System provides quantitative outputs of selected fire behavior characteristics for certain major Canadian fuel types and topographic situations.

Canadian Forest Fire Danger Rating System (CFFDRS): The national system of rating fire danger in Canada. The CFFDRS includes all guides to the evaluation of fire danger and the prediction of fire behaviour such as the Canadian Forest Fire Weather Index System and Canadian Forest Fire Behaviour Prediction System.

Canadian Forest Fire Weather Index (FWI) System: A subsystem of the Canadian Forest Fire Danger Rating System. The components of the FWI System provide numerical ratings of relative fire potential in a standard fuel type (i.e., a mature pine stand) on level terrain, based solely on consecutive observations of four fire weather elements measured daily at noon (1200 hours local standard time or 1300 hours daylight savings time) at a suitable fire weather station; the elements are dry-bulb temperature, relative humidity, wind speed, and precipitation. The FWI System consists of six components. The first three are fuel moisture codes that follow daily changes in the moisture contents of three classes of forest fuel; higher values represent lower moisture contents and hence greater flammability. The final three components are fire behaviour indexes representing rate of spread, amount of available fuel, and fire intensity; their values increase as fire weather severity worsens. The six standard codes and indexes of the FWI System are:

1. Fine Fuel Moisture Code (FFMC): A numerical rating of the moisture content of litter and other cured fine fuels. This code indicates the relative ease of ignition and flammability of fine fuel.

2. Duff Moisture Code (DMC): A numerical rating of the average moisture content of loosely compacted organic layers of moderate depth. This code indicates fuel consumption in moderate duff layers and medium-sized woody material.

3. Drought Code (DC): A numerical rating of the average moisture content of deep, compact, organic layers. This code indicates seasonal drought effects on forest fuels, and the amount of smouldering in deep duff layers and large logs.

4. Initial Spread Index (ISI): A numerical rating of the expected rate of fire spread. It combines the effects of wind and FFMC on rate of spread but excludes the influence of variable quantities of fuel.

5. Build-up Index (BUI): A numerical rating of the total amount of fuel available for combustion that combines DMC and DC.

6. Fire Weather Index (FWI): A numerical rating of fire intensity that combines ISI and BUI. It is suitable as a general index of fire danger throughout the forested areas of Canada.

Calculated Manning Level: Manning level for the current day as determined by a calculation of the fire danger indexes and application of the appropriate Manning Level table.

Crew: A temporary crew consisting of three squads placed in high fire danger areas where new ignitions may pose control difficulties at initial attack.

Day Basing: A procedure whereby initial attack resources are positioned away from their regular administrative or operational base for a burning period, in anticipation and readiness for fires that may start in a given area.

Elapsed Time: The difference in time between the beginning of any action and its actual accomplishment; in firefighting operations it is customarily divided into:

1. Discovery Time:The period from start of a fire (estimated or known) until the time of discovery.

2. Report Time: The period from discovery of a fire until the first person charged with initiating suppression action is notified of its existence and location.

3. Getaway Time: The period from receipt of report of a fire by the first person responsible for suppression until departure of the initial attack force.

4. Travel Time: The period between departure of the initial attack force for a fire and its arrival at the fire.

5. Attack Time: The period from receipt of first report of a fire to start of actual firefighting; includes both getaway time and travel time.

6. Control Time: The period from initial attack time until the fire is controlled.

7. Mop-up Time: The period from achievement of control until enough work has been done to ensure the fire cannot rekindle.

8. Patrol Time: The period from completion of mop-up until the fire is declared out.

Frontal Fire Intensity: The rate of heat energy release per unit time per unit length of fire front. Flame size is its main visual manifestation. Frontal fire intensity is a major determinant of certain fire effects and difficulty of control. The Fire Intensity Rank chart is used to determine difficulty of control.

Helitack Crews: Seasonally budgeted highly trained crews of seven persons complimented by a committed medium-size rotary-wing used primarily for initial attack. Crews are placed in high fire danger, high fire risk areas to supplement and enhance forest initial attack capability. These crews are a provincial resource.

High Wind Forecast: A wind forecast for 25 km/h or higher.

Initial Attack Crews: Seasonally budgeted crews of three or more persons stationed at a strategic location for initial attack purposes.

Initial Attack Centre: A predetermined location which is used as a central point for initial attack deployment to provide initial attack coverage for the surrounding initial attack zone.

Initial Attack Zone: The forested area within the sphere of influence of each initial attack centre being considered for activation.

Large Rotary Wing: A helicopter having a seating capacity of more than 16 passengers.

Light Rotary Wing: A helicopter with a seating capacity of six passengers or less.

Medium Rotary Wing: A helicopter having a seating capacity of 7 to 16 passengers.

Proposed Manning Level: The manning level determined on the basis of today's fire danger and the weather forecast for tomorrow. This level is normally NO lower than today's calculated manning level. However, it may be higher than today's calculated manning level if the fire danger is rising.

Required Manning Level: The manning level for tomorrow as determined by a review of the suitability of the proposed manning level. The review is normally based on four defined modifiers, but subjective input is also considered.

Squad: A temporarily hired, trained fire crew of eight persons placed in high fire danger, high fire risk areas for initial attack purposes.

Today's Actual 500 mb Anomaly: The difference between today's 500 mb height and the average 500 mb height for today. Expressed as a number such as +8, 0, -5, etc.

Today's Forecast 500 mb Anomaly: The prediction of tomorrow's 500 mb anomaly.

Trend Forecast: The weather forecaster's interpretation of how tomorrow's fire weather conditions will compare with today's.

Upper Ridge: A meteorological term referring to an elongated area of relatively high atmospheric pressure in the upper atmosphere, usually associated with warm and dry weather conditions at the earth's surface.

Upper Ridge Breakdown: A weakening or collapse of an upper ridge which is generally associated with an increase in fire weather severity at the earth's surface with multiple ignitions from lightning often occurring. Determination of an upper ridge breakdown forecast will be the weather forecaster's responsibility.

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